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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/570,151	03/01/2006	Hiroshi Nakatani	071850	8047

38834 7590 08/21/2008

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EXAMINER	
VAJDA, PETER L	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
08/21/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/570,151	NAKATANI, HIROSHI	
	Examiner	Art Unit	
	PETER L. VAJDA	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/01/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3 and 6-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-182423 in view of Inaba *et al.* (US Patent 5827632).

JP 2002-182423 (henceforth '423) teaches a toner comprising a spherical silica external additive with a mean particle diameter of 0.03 to 1 micrometer ([0006]). The sphericity of said silica particles is taught to be from 1.0 to 1.3 ([0043]). An additional silica (or inorganic oxide) particle is also taught as an external additive having a mean particle diameter of from 5-40 nm ([0046-49]). Said inorganic particles are further taught to comprise titanium oxide, aluminum oxide, zinc oxide, strontium titanate and other particles well known in the art to be conductive ([0048]). Furthermore, the toner comprises a colored resin particle having a sphericity in the range of from 1 to 1.3 and a volume average particle diameter of from 3-12 micrometers ([0009]). Furthermore, it is taught that the ratio of dv/dn of volume average (dv) to number average (dn) particle size be in the range of from 1-1.3 ([0009]). As release agents (parting agents) JP '423 teaches the use of synthetic waxes and polyfunctional ester compounds ([0017-18]).

Suitable charge control agents are further taught and include charge control resins ([0019]). JP '423, however, does not teach a ratio of Dv50/Dv10 of 1.8 or more for the silica particles used as external additives.

Inaba *et al.* teaches a toner comprising silica particles as external additives having an average particle size of from 30 to 120 nm. Furthermore, said particles have a particle size distribution such that particles with a particle size from 5-30 nm are present in an amount of from 15-45%, particles with a particle size from 30-60 are present in an amount of from 30-70%, and particles with a particle size greater than 60 nm are present in an amount of from 5-45% (Abstract). Having such a particle size distribution is taught to prevent the embedding of the hydrophobized inorganic fine powder (which functions as a flowability improver) from being embedded at the toner particle surfaces, thereby allowing the toner to exhibit stable performances even for long periods of use (Abstract). Figure 1 depicts a particle distribution of silica particles and is taught to have an average particle size of 40 nm (Col. 16 ln. 25-33). In figure 1, 6% of the particles have a particle diameter of from 10 to 20 nm and an additional 23% of the particles have a particle diameter of between 20 and 30 nm. It is therefore a safe assumption to assume that 10% of the particles have a diameter of between 10 and 25 nm. Of the total 23% of particles having a particle size between 20 and 30 nm, the lowest 4% portion (out of 23%, therefore 4/23) almost certainly have a particle diameter between 20 and 25 nm. Since 6% of the particles have a particle diameter between 10 and 20 nm and an additional 4% have a particle diameter between 20 and 25 nm, the 10% of the particles having the lowest particle diameters have diameters in a range of

from 10 to 25 nm. A reasonable mean particle diameter is therefore 17.5 nm (10 nm + 25 nm/ 2 = 17.5 nm). Therefore, Dv50 is 40nm (as taught by Inaba), Dv10 is 17.5 nm and D50/D10 = 40/17.5 = 2.3. Inaba therefore teaches a distribution of inorganic oxide particles that encompasses a Dv50/Dv10 relationship of greater than 1.8 and greater than 2.0. Furthermore, Inaba teaches that the inorganic particles have particle sizes ranging from 5 to 30 nm, 5 to 60 nm and 60-120 nm.

Inaba teaches that this particle size distribution prevents the embedding of the hydrophobized inorganic fine powder (which functions as a flowability improver) from being embedded at the toner particle surfaces, thereby allowing the toner to exhibit stable performances even for long periods of use. Therefore, it would have been obvious to any person of ordinary skill in the art at the time of the invention to have produced the toner of JP 2002-182423 wherein the external silica particles are present in the particle size distribution taught by Inaba for external inorganic additives. Inaba does not specifically teach silica, although silica is a well known inorganic additive. Furthermore, the benefit imparted by the particle size distribution is not one that is generated by the chemical properties of the inorganic fine powder but rather by the particle size of said inorganic fine powder. Furthermore, since JP '423 teach multiple external additives it would have been equally obvious to have employed different particles within the particle size distribution taught by Inaba so that the specific benefits of each separate inorganic particle used by JP '423 could be coupled with the improved properties taught by Inaba to be imparted to toners by employing external additives of different sizes.

Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-182423 in view of Inaba *et al.* (US Patent 5827632) as applied to claims 1-3 and 6-16 above, and further in view of JP 2003-029450.

The complete discussions of JP '423 and Inaba *et al.* above are included here. Neither inventor, however, teaches a bulk density for the external additives present on the toner particles.

JP 2003-029450 (henceforth JP '450) teaches a toner comprising colored particles and an external additive wherein said external additive is taught to have a bulk density of from 100 to 250 g/l ([0013]). JP '450 teaches that when an external additive (JP '450 teaches silica) has a bulk density of less than 100 g/l it makes it difficult for the additive to adhere to the toner particle and the additive separates. The loose additive adheres to the photoconductor, transfer member, and other parts of the xerographic apparatus and causes problems such as filming and poor cleaning. Furthermore, when a two component developer is employed the additive may adhere to the surface of the carrier and thereby reduce the charging abilities of the carrier. However, if the additive has a bulk density greater than 250 g/l, the mobility of the toner is decreased and the ability of the additive to disperse in the toner production steps will also decrease ([0014]).

Therefore, according to JP '450 the bulk density of a silica additive is very important to its ability to interact with the toner particles and thereby prevent it from clogging and contaminating the various parts of the xerographic image as well as the

carrier particles in a two component system. As such, it would have been obvious to any person of ordinary skill in the art at the time of the invention to have created the toner particles of JP 2002-182423 wherein the external silica particles are present in the particle size distribution taught by Inaba for external inorganic additives and wherein the external silica particles have the bulk density taught by JP 2003-029450. This would have resulted in a toner with silica that adhered to the toner particles better and reduced contamination of the xerographic apparatus and the carrier particles in two component developer.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-182423 in view of Inaba *et al.* (US Patent 5827632) as applied to claims 1-3 and 6-16 above, and further in view of Niwa (US PGP 2003/0027070).

The complete discussions of JP '423 and Inaba *et al.* above are included here. Neither inventor, however, teaches a molecular weight for the charge control resin present in the toner particles.

Niwa teaches a toner comprising a binder resin, a colorant and a charge control resin (Abstract). Furthermore, said charge control resin is taught to have a molecular weight of from 2,000 to 40,000. Niwa teaches that when the molecular weight is above this range, handling upon preparation of toner particles is poor so that uniform toner particles cannot be obtained. However, when the molecular weight is below this range, the dispersability of the pigment in the resulting toner is lowered and it is difficult to achieve satisfactory charging which results in fogging (p. 3 [0038]).

Therefore, it would have been obvious to any person of ordinary skill in the art at the time of the invention to have constructed the toner of JP 2002-182423 wherein the external silica particles are present in the particle size distribution taught by Inaba for external inorganic additives and wherein the charge control resin of JP 2022-182423 had a molecular weight in the range taught by Niwa. This would have allowed for uniform distribution of the charge control resin and a toner which did not exhibit fogging as a result of satisfactory and uniform charging.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER L. VAJDA whose telephone number is (571)272-7150. The examiner can normally be reached on 7:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher RoDee/
Primary Examiner, Art Unit 1795

/PLV/ 08/11/2008